

URBAN HIGHWAY FREIGHT MODELING INCLUDING INTERMODEAL CONNECTORS FOR FLORIDA

PROBLEM STATEMENT

Over the past few decades, there has been a growing interest in planning for the safe, efficient, and smooth movement of goods and freight across all modes of transportation. This is because of the growing realization that freight transportation and economic development are inextricably linked to one another. Planning for the safe and efficient movement of freight is directly tied to the economic development of an area, because businesses often locate in areas where just-in-time logistics practices can be implemented effectively and reliably.

Despite the growing importance of freight transportation planning, the state of freight transportation modeling has lagged behind that of passenger transportation modeling, primarily due to the lack of data and the lack of an understanding of the modeling issues pertinent to freight transportation. In addition, freight transportation is invariably influenced by the economic, trade, and logistics activity at intermodal transportation facilities such as seaports, airports, rail terminals, truck terminals, and warehouses. However, past work in the modeling of freight transportation demand has not been able to integrate intermodal connectivity to reflect the importance of highway connectors that transport freight to and from intermodal terminals.

This research project was undertaken in response to the need to obtain detailed data about freight movements in the State of Florida and to understand the issues and model design elements associated with urban freight transportation modeling.

OBJECTIVES

The objectives of the research project were to do the following:

- Review freight transportation modeling methods currently in use and under development around the country with special emphasis on urban freight transportation modeling practice in Florida
- Assemble freight transportation data for the State of Florida that urban areas can use for freight transportation planning purposes
- Identify freight transportation model development issues with emphasis on the freight trip generation, trip distribution, modal choice, and assignment steps of the modeling process
- Design a freight transportation modeling system that recognizes intermodal connectivity, multimodal choices, and commodity and truck types

- Provide guidance on the statistical and econometric issues associated with development, specification, and estimation of urban freight transportation models from aggregate freight transportation data sets.

FINDINGS AND CONCLUSIONS

This research project has provided several key deliverables that would be of immense use to local agencies as they plan for the safe and efficient movement of goods, freight, and services in their areas. Some of the major highlights of the research findings are as follows:

- The state-of-the-art in freight transportation modeling has made great strides in the past decade. Many local and state agencies have engaged in freight transportation data collection and freight transportation model development efforts with a view to enhancing their ability to plan for the needs of freight transportation. The methods are diverse and include econometric, network/logistics-based, disaggregate, aggregate, and four-step modeling procedures. Many areas in Florida have kept up with the advances in freight transportation modeling with more than a half-dozen areas collecting detailed freight trip data and developing freight trip generation, trip distribution, and truck assignment models. These models are readily applied within the Florida Standard Model context.
- This research project has resulted in the development of a CD containing the latest Reebie Transearch Freight Movement Data for the State of Florida. The Reebie data contains details about the mode, shipment type, commodity type, and origin and destination of shipments at the zip code and county levels of aggregation. The data set is very rich in detail and can be used to obtain basic measures of freight movements by mode and commodity type within the state. This data set has been used to analyze commodity trip productions, commodity trip attractions, modal split, and trip length distributions for a variety of commodity types.
- There are many issues associated with the development of freight trip generation, trip distribution, mode choice, and assignment models. The report provides a detailed listing of all of the issues and data needs associated with each step of the freight transportation modeling process including intermodal connectivity issues. Statistical and econometric issues associated with the estimation and application of freight transportation models such as model misspecification, heterogeneity, forecasting input variables, and aggregation error are important considerations in freight transportation model development. The report provides a detailed description of these issues and methods to overcome them.
- The research project presents a conceptual design that provides a detailed depiction of an urban freight transportation modeling system. The design identifies all of the elements and the interactions and data flows among them. The inputs and outputs associated with each element are identified in a generic fashion so that the model design can be adapted to any area in the state.

BENEFITS

The research project has resulted in the development of a detailed freight transportation data set for the State of Florida together with a detailed freight transportation model design that can be adapted in any area of the State of Florida. Local and state agencies that have the responsibility to make multibillion dollar transportation investment decisions will greatly benefit from the results of this research project. They will be able to analyze freight transportation movements in their areas and develop robust, accurate, and reliable models of freight transportation demand while explicitly accounting for intermodal facilities. The model design presented in this research will help the state save time and become more efficient as it will directly improve the ability to plan for freight transportation in the state and test alternative freight transportation policies.

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